

Additional file 1 Material used in the construction of our interpretive timeline (Figure 5) created from data from our fire history study on Catoctin Mountain, Maryland, USA, in 2018. It also contains additional historical and cultural context for the events recorded in the main section of the article.

The area now called Thurmont, Maryland, USA, was Algonquin and Lenape land for thousands of years before European occupation. Native people quarried rhyolite tool-making materials in the Catoctin Mountains and farmed lowlands in the Monocacy Valley (Stewart 1987, 1989; Geasey and Ballweber 1991; Bedell *et al.* 2011a). By the early eighteenth century, the more southern Tuscaroras joined the Haudenosaunee (also known as the Iroquois Confederacy), moved north, and took stewardship of the land (Rountree and Davidson 1997). European colonization in the Thurmont area began with Germans, other Europeans, and enslaved Africans in 1729 (Williams and McKinsey 1910, Wehrle 2000, Bedell *et al.* 2011a). By the 1750s, the area was incorporated and named Mechanicstown, then renamed Thurmont in 1894.

Major industries in town during the early 1800s included sawmills and tanneries, but the largest was the Catoctin Iron Furnace (Wehrle 2000; Additional file 5). The Catoctin Iron Furnace was first built in 1774 on the 694 hectares of land awarded by the colonial governor to Thomas Johnson and his brothers (National Heritage Corporation 1975). The furnace began producing pig iron in 1776 (National Park Service 2018) and was fully operational by 1777 (Wehrle 2000). The Catoctin Iron Furnace was one of hundreds of iron furnaces throughout colonial America that produced cannonballs for the Continental Army during the American Revolutionary War (Contract Archaeology, Inc. 1971).

Skilled enslaved workers were essential to the success of the furnace. After the Revolutionary War ended, the Catoctin Iron Furnace's deed was updated to show that the Catoctin Iron Furnace included many buildings, barns, and houses. At the time, four black men who were skilled iron workers were enslaved by the furnace corporation (National Heritage Corporation 1975). The Johnsons later requested, in 1792, to move additional enslaved people from Virginia, USA, because they sought to expand their charcoal industry (Maryland State Archives 2019).

On the same day (22 December 1792) that the Maryland Assembly approved the request for additional enslaved laborers, the Assembly also passed a law against fires. This law, enacted one year after a fire scar in our study (Figure 2), reflected the Catoctin Iron Furnace's need for trees to supply charcoal: "Whereas it is represented to this general assembly, by the petition of sundry inhabitants of Frederick county, that that part of the Catoctin mountain lying in the said county, is frequently set on fire, whereby the growth of young timber is much injured..." (Maryland State Archives 2019).

Human activity increased steadily during the nineteenth century. Construction of the C&O canal directly south of our study area was completed by 1833. Trade increased as additional sections to the west opened and the entire canal length was completed by 1850 (National Park Service 2020b). The mid to late 1800s was the height of the steam era, a time period during which locomotives probably continued to set fire to the land adjacent to tracks (Clarkson 1964). The railroad route along the Potomac River from Frederick to Hagerstown was completed in the 1850s, and an east–west railroad from Thurmont to Hagerstown was surveyed by 1831 and built between 1863 and 1869 (Library of Congress 2020). The build date is midway through the period of most frequent burning, so earlier fires did not depend on this railroad for ignitions.

Iron workers repeatedly harvested trees in the surrounding mountain forests to produce charcoal fuel for the furnace. Charcoal kilns and sled paths were utilized within a kilometer of our study area (Bedell *et al.* 2011b). Ignitions during the nineteenth century were likely connected to the industrial charcoaling operations taking place on the landscape until 1873 when the Catoctin Iron Furnace converted from charcoal to mined

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coal (Natural Heritage Corporation 1975). In 1873, the furnace was converted to coal in an attempt to remain competitive. The Catoctin Iron Furnace was the last remaining furnace in Maryland until it closed in 1903 and was dismantled in 1905. The US federal government subsequently bought the furnace land and buildings for a Recreational Demonstration Area (RDA; Maryland Historical Trust 2018). Fires were ignited to clear and maintain land for huckleberry and blueberry production west of Thurmont (Wehrle 2000).

Newspaper articles describe fires through the 1930s being set by blueberry (or huckleberry) pickers, and cultural burning during the Great Depression may have been a significant source of ignitions in the area even after the end of industrial charcoaling (Additional file 3). In 1906, the five-year average price per quart of wholesale wild-grown blueberries was 10.8 cents, equivalent to \$2.57 in 2019 (Coville 1910); thus, people in the area had an economic incentive to maintain their collection areas using fire. Pruning of blueberry bushes by fire benefits berry yields through increased shoot production, pest and disease control, and soil changes (Hoefs and Shay 1981; Duchesne and Wetzel 2004). On 9 April 1915, the Baltimore Sun reported: “It is said the fire was started by persons who claim that a prolific berry crop follows a clearing by fire.” Fires in 1934 and 1936 were similarly ascribed to berry pickers in the Frederick Post: “William G. Renner, warden at Catoctin Furnace was of the opinion that it was Huckleberry pickers,” and “Huckleberry pickers on Bob’s hill” were responsible (2 August 1934 and 20 April 1936, respectively). In Allegany County, Maryland, local residents were asked about potential damage to timber values by fire and were quoted as saying, “it is easy to find a tree around here, but not so easy to find a good huckleberry patch” (Mash 1996).

Other blazes were accidentally started by hunters or were listed as “incendiary” (arson). The May 1936 fire, for example, was also said to be started intentionally by farmers who were involuntarily displaced from their land by the federal government for creation of the national park (Wehrle 2000). Burning on Catoctin Mountain was already illegal (Maryland State Archives 2019), but efforts to stop people from using fire strengthened in the 1920s and were reported by a local newspaper: “A number of the patrolmen carried guns, and declared they would shoot any persons caught in the act of firing the forests” (The Frederick Post, 8 September 1929).

The Civilian Conservation Corps (CCC) and the Works Progress Administration (WPA) started construction for Catoctin Mountain Park in 1936 (Maryland Historical Trust 2018; Additional file 6). In 1954, Catoctin Mountain Park transferred from the RDA and the land was divided to create two smaller parks: Cunningham Falls State Park and Catoctin Mountain National Park.